

Practical Geostatistics & Mineral Resource Estimation Master Class

comprehensive and up to date training course that will prepare and equip you with the necessary knowledge and techniques to accurately estimate and evaluate mineral resource based on practical methods that has been proven worldwide

Date: 21st – 25th August 2017

Venue: Oaklands Inn & Conference Centre

Course includes
5nights
Accommodation
B & B

Led by world class expert

Master Class Format

This course will be an interactive and participative workshop where participants will be encouraged to discuss their own practice and compare it to others and recognised best practice. Real projects and case studies will form an important part of the workshop and participants will be encouraged to discuss and reflect on their own organisations practices and ways to improve them.

Pre-course Questionnaire

Dr. Isobel Clark would like to customize the class based on your specific needs. Pre-Course Questionnaire will be sent to you prior to the workshop to complete. Dr. Isobel Clark will analyse in advance and address the issues during the course.

Certificate of Attendance

Upon the successful completion of this course, you will receive a Certificate of Attendance bearing the signatures from Dr. Isobel Clark and the Course Organizer. The Certificate will also indicate your CPD Credits and serve towards your professional advancement.

Who Should Attend

- Geologists (Exploration, Production, Resource)
- Mining Engineer / Engineering Manager
- Mine Evaluator / Evaluation Manager
- Mine Planners / Planning Manager
- Mine Surveyors / Survey Manager
- MRM Practitioners
- Anyone with interest in the evaluation of mineral resources and reserves

Dr. Isobel Clark

Bsc Msc DIC PhD FSS FIMMM FSAIMM FAusIMM CEng MMSA(QP)

- Professional mining engineer with 40 years of experience
- Author of Practical Geostatistics (1979) and (2000)
- Director, Geostokos Limited, Scotland
- Former Professor in Camborne School of Mines, University of Exeter, England
- Former Professor, University of the Witwatersrand, Johannesburg
- 11 years of lecturing at Royal School of Mines, London



This 5-day course will consist of two parts.

Part 1 – Practical Geostatistics Workshop

The first 3 days of the course will cover the practical aspect of Geostatistics. It will bring the delegates to in-depth understanding of the mysteries of ordinary kriging and its variants. This is a classroom course and includes manual exercises to reinforce understanding of the techniques. This workshop composed of lectures augmented by practical PC/laptop-based exercises covering many different applications. Case studies ranging from coal through base metals and iron ore to precious metals such as gold and platinum will be covered. All case studies are drawn from Dr Clark's extensive worldwide experience. Practical Geostatistics is aimed at any professionals dealing with the estimation from or interpolation between samples collected on a spatial basis. A minimum of mathematics is necessary to explain the techniques - mainly simple algebra, up to understanding the concepts behind solving simple sets of simultaneous equations and differentiating x^2 . Questions and discussions are actively encouraged. Participants are advised to bring a laptop.

Part 2 – Mineral Resource Estimation Master Class

Participants in this Master Class are expected to be conversant with Geostatisticals procedures or at least completed Practical Geostatistics Workshop. Participants are invited to contribute discussion and ideas from their own practical experiences and to bring their own data for preliminary analysis during and after the workshop. The workshop is aimed at professionals who are interested in discussing the real world application of resource estimation techniques. Using little or no mathematics, Isobel Clark discusses case studies involving interpretation of everyday questions, such as:

- Is my data homogeneous enough for geostatistical mapping?
- Do I have trends in my data and (if so) what kind?
- How do I interpret semi-variograms which deviate from the ideal shapes?
- What Kriging method should I use (if any)?
- Should I be using Kriging results at all?

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BYO – BRING YOUR OWN SESSIONS!!

Get the trainer to address the concern you have in YOUR OWN projects!

YOU can BRING and ANALYSE YOUR own data using Practical Geostatistics 2000 teaching software under the supervision of Dr. Isobel Clark.

Take away copies of all software and data sets! You will be provided with a CD containing all relevant teaching materials.

TSK

Training, Skills & Knowledge

SAAMA

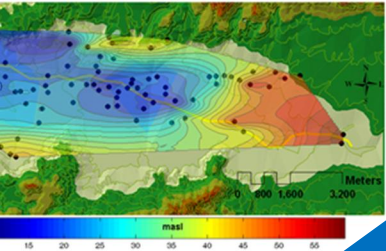
Validation Number: TBA
5 CPD Credits

Delegates will claim
5 CPD Credits



5 Day Practical Geostatistics & Mineral Resource Estimation Master Class

About Your World Class Presenter



Dr. Isobel Clark

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Isobel Clark is renowned for her down-to-earth approach to resource estimation in general and geostatistics in particular. After 40 years of teaching, software development and consulting in mineral resources and reserves, she will present this practical workshop with real world examples.

Dr Isobel Clark is a professional Mining Engineer who specializes in the technical evaluation of mineral resources and reserves at all stages in the life of a mine. She has taught, researched and consulted in the field of geostatistics for over 40 years and has wealthy experience in practical application of computer-based design and evaluation methods. Possibly best known as the author of the introductory text "Practical Geostatistics" (1979), she now co-author of a more complete textbook "Practical Geostatistic" (2000). With proven communication skills honed by training non-specialists, she has conducted numerous short courses on a regular basis to companies and educational institutions in four continents. Dr Clark lectured for 11 years at the Royal School of Mines, Imperial College, London, at the University of Witswatersrand in Johannesburg for 9 years and was visiting professor at Camborne School of Mines for 2 years. Isobel joined Xstract Mining Consultant in July 2011 within Xstract's Perth office, and also maintain her position as associated educator at Geostokos (Ecosse) Limited, an international consultancy company based in Central Scotland. Her recent consultancy assignments range from the evaluation of tantalite deposits in Mozambique to the study of protected sea-birds in the UK. Dr Isobel received her Ph.D. in Engineering from the University of London, M.Sc. in Biometrics from the University of Reading, B.Sc. in Pure and Applied Mathematics from Strathclyde University and Diploma in Educational Broadcasting from the University of York. In addition to formal qualifications, she regularly attends relevant conferences to learn new methods, theory and applications. She also attends seminars and meetings of the various professional societies of which she have memberships.

Partial list of Consultancies and Projects in Africa

- Ad hoc advice on mineral sands applications, for Shell Minerals, **South Africa**
- Advice on sampling at Richards Bay Minerals, **South Africa**
- American Mineral Fields Int. Ltd.**, supervision of feasibility study --- valuation and geology
- Assessment of Alexander Bay Diamond Mine, **South Africa**
- Audit of resources, tantalite deposit, **Mozambique**
- Evaluation of mining resources, Hartebeestfontein Mine, **South Africa**
- Fergusson Stewart, **Johannesburg**, evaluation of Joel Mine.
- Freda-Rebecca Mine, **Zimbabwe** for Cluff Minerals (and later Ashanti GoldFields)
- General Mining Union Corporation, **Johannesburg**
- Ghanaian Australian Goldfields, geostatistical modelling and advice on valuation
- Hartley Platinum, BHP **Zimbabwe**, peer review.
- Investigation of problems with Mine Call Factor for Libanon Mine, **South Africa**
- ISCOR Mining, audit of valuation for deposit in **Zaire**
- Johannesburg Consolidated Investment Limited, **Johannesburg**
- Lonrho **Zimbabwe**, advice on evaluation of small gold deposits
- MIMCO, **South Africa**, evaluation of gold mine.
- MineNet South Africa, evaluation of resources and reserves at Skorpioen project, **Namibia**
- Mineral resource and reserve valuation for Skorpioen Zinc project in **Namibia**
- Palabora Mine, underground development, RTZ Management Services, **Johannesburg**.
- Potgietersrus Platinum, JCI, benchmark evaluation.
- Public statement of remaining reserves at the Droogebult Mine, **South Africa**
- Resource evaluation studies for Lonrho Platinum, **South Africa**.
- Short training for **Nigerian Geological survey**
- Small scale consultation, AngloGold Ashanti Goldfields
- Study of sampling methods and calibrations for Namco Diamond Mining, **Cape Town**
- Tenke Fungurume project, **Congo** audit of computerized database
- Vaal Reefs Exploration & Mining Co. Ltd., audit of annual reserve statement
- Valuation advice for the Ayanfuri Project, **Ghana** for Cluff Minerals.

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Register and reserve your seat for this level master class

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5 Day Practical Geostatistics & Mineral Resource Estimation Master Class

Part 1 (21st -23rd August 2017)

Practical Geostatistics

Session 1

- The basic assumptions of spatial estimation methods
- Inverse Distance interpolation methods
- Classical statistics: the Normal distribution

Session 2

Statistical Methods

- The lognormal distribution
- Confidence levels
- Standard errors
- Grade/tonnage curves

Session 3

Statistical Methods

- Construction and interpretation of semi-variograms
- Identification of trends
- Multi-component models
- Confirmation of basic assumptions
- Outliers

Session 4

Geostatistical Methods

- The experimental semi-variogram
- Modelling semi-variograms
- Trends
- Anisotropy
- Geological features

Session 5

Geostatistical Methods

- Variations on kriging
- Lognormal methods
- Indicator methods
- Non-linear geostatistics
- Regression problems (conditional bias)
- Simulation

Session 6

Case Studies and discussions on your own data (BYO)

All delegates will receive

5 nights' accommodation (B & B)

Part 2 (24th – 25th August 2017)

Mineral Resource Estimation Master Class

In Part 2 of this course YOU will be bringing YOUR own data. This will be a BYO session preliminary study of real data sets and open discussion guided by participants' interests and previous Q&A sessions.

on participants' interests we can go in depth to the following topics:

1. Basic assumptions and requirements for mineral resource estimation
2. Data validation, top-cuts and capping
3. Construction, interpretation and modelling of semi-variograms
4. Model validation and reconciliation with geological knowledge
5. Geostatistical resource estimation, 3D and block modelling and Kriging
6. Other Kriging techniques, such as MIK and Lognormal Kriging
7. Discussion covering the advantages/limitations of different estimation methods
8. Reserve estimation and possible classification definitions
9. Geostatistical Simulations and Risk Assessment
10. Grade control
11. Drill hole spacing analysis
12. Dynamic Anisotropy estimation

Session 7

Case Studies and BYO

- construction and interpretation of semi-variograms
- identification of trends
- confirmation of basic assumptions
- outliers

Session 8

Case Studies and BYO

- choice of appropriate kriging techniques
- practical applications of kriging

Session 9

Case Studies and BYO

- discussion of case studies from course participants
- general discussion of case studies

Session 10

Case Studies and BYO

- general discussion of case studies
- simulation techniques

Delegate Booking Form

5 Day Practical Geostatistics & Mineral Resource Estimation Master Class
21st – 25th August 2017, Oaklands Inn & Conference Centre

R24 990

Per Delegate
Excluding Vat
Includes
5nights
accommodation

Fax Completed form to: 086 625 8511

Shau

Company Name: _____

Type of Business: _____

Address: _____

Vat No: _____ Tel _____

Delegate Name	Delegate Position	Email Address
1.		
2.		
3.		
4.		
5.		

Terms & Conditions

The following terms and conditions will apply:

All payments to be made directly to TSK Training & Conferences, payment is required in full 5 days from date of invoice. No seats will be reserved, unless other wise stated by TSK Training & Conferences . TSK Training & Conferences reserves the right to change speakers, program content date and venue, due to unforeseen circumstances. The signed registration form is a legally binding document. The conference / workshop fee includes conference / workshop material, Lunches and refreshments. TSK Training & Conferences will not be held liable for travel and accommodation.

Cancellations

All cancellations must notify TSK Training & Conferences in writing and all cancellations will be subject to approval by TSK Training & Conferences management.

All cancellations made 60 days **which excludes weekends, holidays and public holidays** prior to date of the above mentioned event will be subject to a 50% cancellation fee. Cancellations made within 31 days **which excludes weekends, holidays and public holidays** of date of the above mentioned event will be subject to a 100% cancellation fee. There will be no refunds or credit vouchers. Non arrivals will attract the full event/course fee.

Substitutions

Delegates of any substitutions must notify TSK Training & Conferences in writing. There is no charge for substitutions. TSK Training & Conferences will not be held liable for incorrect delegate details on certificates, etc. in the event of substitutions been made on the day of the conference/ workshop. Delegates will be issued with a credit voucher, which may be used at another of our events **should** TSK Training & Conferences cancel or postpone an event due to the state of affairs beyond our control. Views expressed by speakers and facilitators are not necessarily those of TSK Training & Conferences

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2. Bank Transfer: Hamesha Trading (pty) Ltd t/a TSK

TRAINING CONFERENCES

Bank: FNB Account No: 62354354799 **Branch Code:** 221325

NB: TSK TRAINING & CONFERENCES ARE NOT LINKED TO ANY OTHER BANK

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Position: _____

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